

REMARKS

The two independent claims, 1 and 24, have been amended in response to the rejection under 35 U.S.C. §112, second paragraph. In addition, both independent claims have been amended to recite that the claimed fire-resistant sheet is a sheet which is press-molded with heating, and that the fire-retardant capsules are fixed in the fiber sheet by the fiber having a low melting point during press molding with heating. These recitals are supported by the disclosure of the specification e.g. at p. 3, line 31; p. 22, lines 6-25; p. 26, lines 7-8, p. 30, lines 8-9; p. 30, line 18 - p. 31, line 6. Two new claims (25 and 26), respectively dependent on claims 1 and 24, have been added to afford assured specific coverage for an important aspect of the invention; the new claims are supported by the disclosure of the specification at page 6, lines 30-32. Since the present amendment does not increase either the total number of claims (beyond that previously paid for) or the number of independent claims, no additional fee is necessary.

Claims 1 (independent; amended), 2, 5 and 16 - 23 (all directly or indirectly dependent on claim 1) and 24 (independent; amended) are in the application. No claim has been allowed.

Rejection under § 112

All the claims have been rejected under 35 U.S.C. §112, second paragraph, as indefinite because the two independent claims both recited that the fiber sheet "consists of or contains a fiber having a low melting point." In response, "consists of or contains" has been replaced with the clearly definite term "comprises" in each of claims 1 and 24. It is submitted that this amendment of the independent claims fully and self-evidently overcomes the §112 rejection, both as to claims 1 and 24, and as to claims 2, 5 and 16 - 23, which were rejected under §112 only by virtue of their dependence on claim 1.

Rejection under § 103(a)

Claims 1, 2, 16 - 19 and 21 - 24 have been rejected under 35 U.S.C. §103(a) as unpatentable over WO 02/038374 (Ogawa et al. WO '374, translated as U.S. Pub. No.

2004/0100125, Ogawa et al.) in view of U.S. patent No. 6,362,269 (Ishihata et al.), with U.S. patent No. 6,384,128 (Wadahara et al.) cited "to show a state of fact." Claim 5 has been rejected under §103(a) on Ogawa et al. WO '374 in view of Ishihata et al. and further in view of U.S. patent No. 5,188,896 (Suh et al.), and claim 20 has been rejected under §103(a) on Ogawa et al. WO '374 in view of Ishihata et al. and further in view of U.S. Pub. No. 2005/0263345 (Erickson et al.).

With reference to the rejection of the claims on the cited art, it may initially be noted that in their response to the last previous Office Action, applicants stated that

"The characteristic of the invention defined in amended claims 1 and 24 is to fix firmly fire retardant capsules to the fire sheet having a low melting point and this characteristic is not disclosed in any of references" (Amendment filed 5/28/08, p.6).

Referring to applicants' argument, the Office Action of July 17, 2008, asserts (p. 11) that the argument "appears to be merely descriptive of an end-use application for the invention after subsequent treatment," and also observes that "claims 1 and 24 do not recite that the fiber sheet is hot molded into a shape, and a reasonable interpretation of claims 1 and 24 would not lead one of ordinary skill in the art to necessarily presume that the low melting point fiber fixes the fire retardant capsules to the fire sheet." The Office Action continues by saying that

"Since Applicants appear to be arguing further structural and compositional requirements, formed by subsequent treatment to the claimed invention, which are not set forth in the claims, Applicants' arguments are outside the scope of the claimed invention" (pp.11-12).

As noted above, by the present Amendment each of independent claims 1 and 24 has been amended to include express positive recitals that the claimed fiber sheet is a sheet "which is

press-molded with heating" and that the fire retardant capsules "are fixed in said fiber sheet by said fiber having a low melting point during press molding with heating." Thereby, the asserted omission in the claim recitals is overcome. It is submitted that the features thus defined by the recitals herein added are entitled to weight in determining the patentability of the amended claims, and as such that they distinguish claims 1 and 24 patentably over Ogawa et al. WO '374, Ishihata et al. and Wadahara et al., and any proper combination thereof, for reasons including those set forth in the aforementioned Amendment filed 5/28/08. Claims 2, 5 and 16 - 23 are submitted to be allowable by virtue of their dependence on claim 1; neither Suh et al. nor Erickson et al. adds anything to the other applied references with respect to the novel and distinguishing features now positively recited in amended claim 1.

Further, applicants submit that these features afford significant advantages in the claimed invention. To give the fiber sheet the property of fire resistance with certainty, it is important that the fire retardant capsules are fixed firmly in the fiber sheet without dropping out. In the present invention the fibers having a low melting point, during press molding with heating, firmly fix the fire retardant capsules in the fiber sheet to avoid dropping out of the capsules.

Ogawa et al. WO '374 describes a fiber sheet including a fiber having a low melting point such as polyethylene fiber, polypropylene fiber and the like, but no fire retardant capsules are mixed in the fiber sheet. Stated with reference to Pub. No. 2004/0100125, the only mentions of "fire retardant" found in Ogawa et al. WO'374 are in paragraph [0031], which says that "said phenolic resin may be modified by co-condensation polymerization or mixing by adding a third component" and includes unspecified "fire retardant" in a long list of examples of such third component, and in paragraph [0034], which sets forth that "Further, water or oil repellant agent . . . , fire retardant, antiseptic, insect repellant . . . , antioxidant, ultra-violet absorber, fungicide, pigment, dye, filler, deodorant and the like may be impregnated in said synthetic resin impregnated non-woven fabric" Neither of these passages suggests that any "fire retardant," or any capsules, are "fixed in the fiber sheet by the fiber having a low melting point during press molding with heating" as is now expressly recited in each of amended claims 1 and 24.

Recognizing that Ogawa et al. WO '374 "does not appear to teach that the fire retardant capsules consist of a water soluble fire retardant powder covered with a water insoluble synthetic

resin shell," the Office Action cites Ishihata et al. as teaching "a resin composition suitable for use in molded articles comprising an aromatic resin, fibers and phosphorus or microencapsulated phosphorus particles, wherein the phosphorus is encapsulated by a thermosetting resin." It may be noted that the fibers of Ishihata et al. serve as a reinforcing filler rather than form a fiber sheet, and are exemplified by inorganic fibers that would not have a melting point below 180°C as the present claims require (see Ishihata et al. at col. 15, line 34 - col. 17, line 36). Thus, in Ishihata et al. as in Ogawa et al. WO '374, there is no disclosure or suggestion of any fire retardant, or any capsules, fixed in a fiber sheet by fibers having a low melting point during press molding with heating.

The Office Action, contending that it would have been obvious to form the fiber sheet of Ogawa et al. WO '374 with microencapsulated red phosphorus particles as taught by Ishihata et al., cites Wadahara et al. as showing "that red phosphorus is inherently water soluble," i.e., that in the assertedly obvious combination of Ogawa et al. WO '374 and Ishihata et al., the fire retardant capsules would inherently meet applicants' claim limitation of "a water soluble fire retardant powder." But Wadahara et al. does not disclose any fiber having a low melting point and therefore fails to suggest applicants' claimed feature of fire retardant capsules fixed in a fiber sheet by fiber having a low melting point during press molding with heating.

In particular, it is submitted that the Office Action is in error in asserting that "Ogawa teaches . . . fire retardant capsules consisting of a fire retardant powder." Neither of the two mentions of "fire retardant" in Ogawa et al. WO '374 identifies the "fire retardant" or its physical state or structure; the statements therein that the phenolic resin "may be modified by . . . mixing by adding a third component" (among which "fire retardant" is listed) and that "fire retardant . . . may be impregnated in said synthetic resin impregnated nonwoven fabric" supply no indication that the "fire retardant" is or might be in the form of capsules or powder, or that it would be fixed in a fiber sheet by fiber having a low melting point during press molding with heating.

Further, it is submitted that the Office Action is in error in asserting, as a reason why it would have been obvious to form the sheet of Ogawa et al. WO '374 with the microencapsulated red phosphorus particles of Ishihata et al., that "the encapsulated phosphorus particles are known in the art to be preferable due to their higher safety and workability." What Ishihata et al.

actually says is that "The microencapsulated red phosphorus is preferably used in the form of master pellets for higher safety and workability," (col. 24, lines 18-20). That is, the attributes of "higher safety and workability" are ascribed to master pellets as opposed to microencapsulated red phosphorus in other forms; Ishihata et al. does not indicate that encapsulated phosphorus particles *per se* have higher safety and workability than other fire retardant materials.

Finally, it is submitted that the Office Action is in error in asserting (based on Wadahara et al.) that red phosphorus is inherently water soluble. Red phosphorus is generally characterized in the literature as water insoluble (see the citation in applicants' last previous Amendment). Consequently, even if it were thought to incorporate the encapsulated red phosphorus of Ishihata et al. in the sheet of Ogawa et al. WO '374, the resultant product would not include fire retardant capsules consisting of a water soluble fire retardant powder covered with a . . . resin shell," as all the present claims require.

The New Claims

New claims 25 and 26, respectively dependent on claims 1 and 24, specify that the "water soluble fire retardant powder is selected from the group consisting of ammonium phosphate, ammonium polyphosphate, ammonium sulfamate, ammonium sulfate and ammonium silicate." Advantages provided by the use of members of this group are pointed out in applicants' specification at p. 6, lines 28-32.

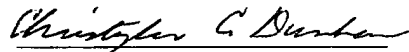
It is submitted that the recitals of claims 25 and 26 present an additional patentable distinction over the applied references and any proper combination thereof. The only material proposed by Ishihata et al. for microencapsulation is red phosphorus. Although the patent mentions other flame retardants (including, at col. 2, lines 61-62, "poly(ammonium phosphate)"), there is no suggestion of microencapsulating these other flame retardants, and since the reason given by Ishihata et al. for microencapsulation is specific to properties of red phosphorus, it would not have been obvious from the reference to provide any of such other flame retardants in microencapsulated form. Consequently, it would not have been obvious from Ogawa et al. WO '374 and Ishihata et al., taken together, to use a microencapsulated water soluble fire retardant powder selected from the group consisting of ammonium phosphate, ammonium polyphosphate,

ammonium sulfamate, ammonium sulfate and ammonium silicate, as the "fire retardant" in Ogawa et al. WO '374. Wadahara et al. adds nothing to the other references with respect to this distinguishing feature of the new claims.


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For the foregoing reasons, it is believed that this application is now in condition for allowance. Favorable action thereon is accordingly courteously requested.

Respectfully,


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